

Patent claims:

1. A process for identifying inhibitors of a eukaryotic potassium channel, in which

5 a) a mutated *S. cerevisiae* cell is used which does not express the three endogenous potassium channels TRK1, TRK2 and TOK1;

b) a eukaryotic potassium channel is expressed heterologously in this mutated *S. cerevisiae* cell;

c) the mutated *S. cerevisiae* cell is incubated together with a substance to be tested;

10 and

d) the effect of the substance to be tested on the eukaryotic potassium channel is determined.

2. The process as claimed in claim 1, wherein the genes TRK1, TRK2 and TOK1

15 are switched off in the mutated *S. cerevisiae* cell (Δ trk1, Δ trk2, Δ tok1).

3. The process as claimed in one or more of claims 1 and 2, wherein the eukaryotic potassium channel is a human potassium channel.

20 4. The process as claimed in one or more of claims 1 to 3, wherein the eukaryotic potassium channel is a HERG1, Kv1.5 or gplRK1.

5. The process as claimed in one or more of claims 1 to 4, wherein the eukaryotic potassium channel is mutated.

25

6. The process as claimed in one or more of claims 1 to 5, wherein the eukaryotic potassium channel is present in a yeast expression plasmid.

30

7. The process as claimed in one or more of claims 1 to 6, wherein the mutated *S. cerevisiae* cell expresses constitutively a growth reporter.

8. The process as claimed in one or more of claims 1 to 7, wherein a substance to be tested, which has an effect on the eukaryotic potassium channel, inhibits the growth of the mutated *S. cerevisiae* cell.
- 5 9. The process as claimed in one or more of claims 1 to 7, wherein the effect of a substance to be tested on the eukaryotic potassium channel is determined by measuring the cell count of the mutated *S. cerevisiae* cells.
10. The process as claimed in claim 9, wherein the cell count is determined via the fluorescence or luminescence of a constitutively expressed growth reporter.
11. A mutated *S. cerevisiae* cell in which the endogenous potassium channels TRK1, TRK2 and TOK1 are not expressed.
- 15 12. A mutated *S. cerevisiae* cell in which the genes TRK1, TRK2 and TOK1 are switched off.
13. A mutated *S. cerevisiae* cell deposited as DSM 13197.
- 20 14. The mutated *S. cerevisiae* cell as claimed in one or more of claims 11 to 13, which *S. cerevisiae* cell expresses heterologously a eukaryotic potassium channel.
15. The mutated *S. cerevisiae* cell as claimed in one or more of claims 11 to 14, wherein the eukaryotic potassium channel is a human potassium channel.
- 25 16. The mutated *S. cerevisiae* cell as claimed in one or more of claims 11 to 15, wherein the eukaryotic potassium channel is a HERG1, Kv1.5 or gplRK1.
- 30 17. The mutated *S. cerevisiae* cell as claimed in one or more of claims 11 to 16, wherein the eukaryotic potassium channel is mutated.

18. A process for the generation of a mutated *S. cerevisiae* cell which does not express the potassium channels TRK, TRK2 and TOK1, wherein the genes TRK1, TRK2 and TOK1 are destroyed by knock-out.

5 19. The use of a mutated *S. cerevisiae* cell as claimed in one or more of claims 11 to 17 for identifying substances which inhibit the activity of the eukaryotic potassium channel.

20. A process of identifying activators of a eukaryotic potassium channel, in which

10 a) a mutated *S. cerevisiae* cell is used which does not express the three endogenous potassium channels TRK1, TRK2 and TOK1;

b) a eukaryotic potassium channel is expressed heterologously in this mutated *S. cerevisiae* cell;

c) the mutated *S. cerevisiae* cell is incubated together with a substance to be tested;

15 and

d) the effect of the substance to be tested on the eukaryotic potassium channel is determined.

20 21. A process of identifying activators of a eukaryotic potassium channel, in which

a) a mutated *S. cerevisiae* cell is used which does not express the three endogenous potassium channels TRK1, TRK2 and TOK1;

b) a eukaryotic potassium channel is expressed heterologously in this mutated *S. cerevisiae* cell;

25 c) the mutated *S. cerevisiae* cell is incubated together with a substance to be tested in the presence of an inhibitor of the eukaryotic potassium channel;

and

d) the effect of the substance to be tested on the eukaryotic potassium channel is determined.

30

22. A test kit comprising a mutated *S. cerevisiae* cell as claimed in any of claims 11 to 17.

23. A process for the preparation of a medicament, wherein

5 a) an inhibitor of a eukaryotic potassium channel is identified with the aid of a process as claimed in any of claims 1 to 10 ,
 b) the inhibitor is prepared or isolated by known chemical processes, and
 c) physiologically acceptable additives are added to the inhibitor.

10 24. A process for the preparation of a medicament, wherein

 a) an activator of a eukaryotic potassium channel is identified with the aid of a process as claimed in either of claims 20 and 21,
 b) the activator is prepared or isolated by known chemical processes, and
 c) physiologically acceptable additives are added to the activator.